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## BY IHEODORE GILL.





1859. but it has been deemei adrisuble :o here it putlished in the Procestings of the Academr.

The famil? of Percoids, as fnallo resrictel br Cavier in the second edition of his " Regne Animal." containei too unlise and heteragemeors en assemblage of genera to be deemed a natural one. The section chieft embracing the speriss o: the old Linnean gezus Peres hating seten iranchiosteral rays. have a strong familr resemblance, with pethags, the exception of tie gentra
 Commerson. The last mentiones genera. althouzh placel in the section with two dorsal fins and seten branchiostegal rars, and interpesed between genera
 related to those fishes.

On the other hand the sexera Ponowis Crar., Centrarchus Cur., and Dudes Cur. and Tal.. placed in the section of the tamilo with less than serer tranchiostegal rars and with a single corsal fin sppear to be aatan? sullies of the $P$ perax. bet at the same time distinguished br some mell markel pecaliarities.

Of the remainir = cenera of the Cavieran Percoils. Cirrhits of Commerson and Chironomus of Cuvier form a zatual familr. to which should perhaps be also teierre? the Chlodreiyli of Lacepede placed br Curier in his family of scienoid.

The Prizocrun of Curier sppes to be either members of the familr oit Holocomrids. or perhaps. more properly. form a Ěamily br themselves relased to :he former.

The genear Thempar. Dutrix. Palaseg ani Heloteg of Curier and Talezcienen are also natural associates and belozz io a peculiar froup.

The Trichodins of Steller, as well as the Trachiri of Linnazs, should be slso witheramn from the Percoils. and mas perhars beloge to one family, for Which Bonaparie's name of Trachinoidx must be reasinel.

The zenera Percis. Pinquiper, sillago and Perciphit of Covier certainly do not belong to the famiry of Percoils. Ther seem to te cquite nearly allied to esch other. and to the Trrefinoul.

The Trannovi of Lingaus form a rery catural iamils. Whose smaties sae apparently with the Sclerogemoid Symanekoizt and the B':

The Holocentri. Myriprisies and Bryuct have been by most mozera nasursiliss regarded as belonging to a family quite distinct from the Percoids. To the same fanilr has been also reterred the genus Trachehthys of Shaw, bus which mar fossibit also be the spe of a distinct be: nearly allien familr.

The thirù division of Curiez o: :he abdominal Percoics bare also been
 ones.

Atter these zumerous subtactions, the family of Peroizs is still one of the richest in genera and species of the class. It is, at the same time. one of tee mos: patural and most unirersally distributed. Representatives are found in the fresh water streams and lakes, or alone the shores of almosi evest count? on the zlobe, but the family attains its highest development in the tonical seas. So similar are many of the species found in the moss distant rezions. that the ere of a natanalist accustome io the examination can alone detec: diťerences. Species of the same gears sse tound alike on esch side of the Atlantic Ocean. in the Caribbeal Sea, on the Western coas: of tropical America. and on all the coaste of tempesate and tropical Asis and Africa.

While the marine species are thes numerons and simils: in the tropiesi regions of the globe, the iresh water species stain their greatest derelonment in number and ra-iery in the temperase zones. Two gezers are represented by closel? related species in Ecrope and North America. O:hers are peculiar to Europe and are balanced in North America br semema charscteristic of that country. The prenonderance of both gesenic :Tpes and of species is grestly
in favor of the "New World." The genera thus peculiar to the different countries are not typical members of the family, but always more or less aberrant. In Europe, are found the Acerince represented by the genus Percis of Klein or Acerina of Cuvier; the Percarince represented by a single genus and species, and the still more aberrant subfamily of Asperulince with the genus Asperulus of Klein or Aspro of Cuvier.

As an offsett to the European genera, there is found in the fresh waters of the United States, a subfamily containing eight genera and numerous spccies. The genera which America shares in eommon with Europe are also more developed in the former country than in the latter, and there are species of two allied genera of which no representatives are found in Europe.

It has been already remarked that the family of Percoids is represented in Europe by three peculiar tribes or subfamilies. In North Ameriea there are only two. In the number of widely distinct forms, Europe is therefore richer than Ameriea. For the differences existing betweeu the Grystince and the Percince can scarcely be considered as of greater value than those between the Percince on one hand and the Acerince aud Asperuli on the other. The differences between the two latter are equally well defined, and it is perhaps doubtful if those genera belong to even the same family as the typical Pereoids. But if the family of Percoids has more varied types in the old world, that one found in the new exhibits far more numerous modifications, which indicate generic and specific value.

We now proceed to exhibit the charaeters of the subfamily of Percince and give a synopsis of all the known genera.

## Percine (Bon.) Gill.

The body is elongated or oblong ovate, more or less compressed. The head in profile is more or less elongated, conical and compressed. The eyes mostly or entirely in the anterior half of the head, are geuerally of large size. The mouth is large or moderate, with the gape extending at least to the anterior margin of the eye. The teeth are generally villiform, rarely canine, and cover the jaws, vomer and palatine bones. The intermaxillary bones have very short ascending processes, and are searcely protractile. The nostrils are two on eaeh side, forming the angles of a transversely oblong or elongated quadraugle ; the anterior nostrils are subtubular, and the posterior simple apcrtures. The opereular bones are more or less pectinated or armed with teeth; the operculum terminates in generally one or more spiniform processes. Th branchiostegal membrane is very deeply emarginated, the sinus exteuding to between the corners of the mouth; there the membranes of opposite sides appear to be folded across each other, and leave a very narrow free margin : there are seven branchiostegal rays on eaeh side, decreasing in size quite uniformly to the external. The scales are of moderate or small size, and on the trunk are pectinated and with a narrow muricated border; those on the head are either pectinated or cyeloid; the scales on the cheeks are smallest, and occasionally searcely perceptible. The dorsals are two in number, and are cither entirely disconnected or united at the base by a low membrane: the first dorsal is well developed, and supported by from seven to fiftecn spines, the longest of which generally equal the height of the secoud dorsal. The anal fin is generally shorter than the second dorsal ; it has two or three spines and from six to thirteen branehed rays. The pectorals are of small or moderate size, in the normal percoid position on the humeral cincture, and have rounded margins. The ventrals are also of moderate size and situated behiud the bases of the pectorals; they have each one spine and five gradually decreasing branched rays; the innermost ray is free from the abdomeu, or scarcely connected to it by an axillar membrane.

The subfamily of Percince as thas limited is a very natural one. Its charac-
ters in many respects correspond to those of the first group of the Percoids of Günther, called by him Percina, but several genera are iutroduced into the latter which destroy the natural character of the group. The genus Paralabrax of Girard belongs more properly to the Serranince, as does also Etchis of Cuvier and Valenciennes. On the systematic value of Acerince and Aspro, we have already remarked. Boleosoma and Pilcoma of Dekay are certainly not natural members of the Percinc, nor cau they even be properly regarded as belonging to the same family; they are more nearly allied to the Gobioids. Finally, Enoplosus of Curier appears to be the type of a distinct subfamily.

The Percince, although represented by many generic forms, are not numerous in species. Many of them are found in fresh water, and probably all of them ascend rivers for a short distance, at some period of the year or are found at their mouths.

The following scheme is supposed to show nearly the natural order and characters of the known genera. As several of them have not beeu seen by us, we remain in doubt as to their natural position.

## 8 I.

Intermaxillary and palatine bones provided with somc large teeth, arranged in rows ; rest of the teeth villiform. Tongue toothless.

Genus Stizostedion (Raf.) Girard.
Les Sandres Cuv., Regne Animal, ed. i. vol. ii. p. 294, . . . 1817.
Stizostedion Raf., Ichthyologia Ohiensis, p. 23, . . . . . 1820.
Lucioperca Cuv, et Val., Hist. Nat. des Poissons, vol. ii. p. 110, . 1828. Sandrus Stark, Elements of Natural History, vol. i. p. 465, . . . 1828.

Body slender, elongate-fusiform, covered with scales arranged in oblique rows. Head semiconical, quite broad, with the cheeks and opercula generally covered with scales; isolated patches of scales on the sides of the posterior part of the head ; rest of the head covered with a naked skin. Preoperculum serrated; operculum armed with from onc to five spines. Dorsal fins two ; the first supported by from twelve to fifteen spines.

This genus is peculiar to the frcsh water streams, rivers and lakes of North America and Europe.

## \} II.

Intermaxillary, vomerine and palatine bones provided only with villiform teeth.
A.

Pseudobranchiæ present.
$a$.
Head with its superior surface scaleless, or only with two scaly areas on each side of the posterior part. Anterior dorsal fin provided with from seven to fifteen spines. Tongue without teeth.
$x$
Lateral line linear, ceasing at the base of the caudal fin.
Genus Perca Linn., Cur.
Perca sp. Linn., Systema Naturæ.
Perca sp. Cuv. et Val., Hist. Nat. des Poissons, vol. ii.
Perca Günther, Cataloguc of the Acanthopterygian Fish, \&c., vol. i. p. 62.
Body elongate-fusiform. Head conical in profile, covered on the cheeks and preoperculum, suboperculum and upper part of the operculum with cycloid scales of moderate size. Operculum generally naked and radiatedly striated. Preoperculum with its anterior margin well defined and entire, and 1861.」
its true margin serratcd posteriorly, and inferiorly armed generally with teeth curved forwards. Operculum with a single spine. Suborbital bone entire. Suprascapular, scapular and coracoid bones serrated. Dorsal fins entirely disconnected ; the first provided with from twelve to fifteen spines. Anal fin furnished with two spines.

This genus, of which the common Yellow Perch is the type, is peculiar to Europe and North America. Its spccies arc not yet well defined or known. Type. Pcrea fluviatilis Linn.

Genus Kuhlia Gill.
Perca sp. Cuv, et Val., Hist. Nat. des Poissons, vol. ii. p. 52.
Percichthys sp. Günther, Catalogue of the Acanthopterygian Fish, \&c., vol. i. p. 62.

Body elongated, fusiform. Head conical. Anterior dorsal fin sustained by nine spines; the posterior with a spine and about eleven articulated rays.
A single species is known ; it is peculiar, so far as known, to the Island of Java.

Type. Kuhlia ciliata Gill.
Syn. Perca ciliata Cuv. et Val.

## Genus Niphon Cuv. et Val.

Niphon Cuv. et Val., Hist. Nat. des Poissons, vol. ii. p. 131.
Body elongated and subfusiform. Head oblong-conical in profile. Lower jaw longer. Preoperculum posteriorly serrated, armed below with anteriorly recurved spines, and at the angle with a large horizontal one. Operculum with three strong spines. Suborbital bone serrated. Dorsal fins connected at the base by a little elevated membrane; the anterior with twelve spines. Anal fin with three moderate spines. A single species is found in the Chinese and Japanese seas.

Type. Niphon spinosus Cuv. el Val.
Lateral line elevated and continued between the median rays to the margin of the forked caudal fin.

> Genus Centropomus (Lac.) Cuv.

Labrax sp. Klein.
Centropomus sp. Lacepede, Hist. Nat. des Poissons, vol. iv. p. 248.
Centropomus C'uv., Regne Animal, ed. i. vol. ii.
Body elongated and fusiform. Head oblong-conical in profile. Lower jaw longer. Preoperculum with the anterior margin furnished with two spines at its angle, and with its posterior and inferior serrated and armed at the angle with larger teeth directed backwards. Operculum with no true spine. Suborbital and suprascapular bones serrated. Dorsal fins entirely disconnected; the first sustained by eight spines. Anal fin trapezoidal, with three spines, the second of which is very large, and with about six branched rays.

Several species are found in the Carribbean Sea, Gulf of Mexico, and along the neighboring coasts.

Type. Centropomus undecimalis Lac.

$$
b .
$$

Head with its dorsal surface covered with scales, extending almost to the nostrils. Anterior dorsal fin furnished with from nine to eleven spines.

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b^{*} .
$$

Teeth on the jaws and palate villiform; tongue or interbranchial isthmus with villiform tecth.
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## Genus Labrax Klein, Gill.

Labrax sp. Klein, Historia Piscium promovendæ Missus quintus et ultimus, p. 25.

Labrax sp. Cuv., Regne Animal, ed. i. vol. ii.
Labrax Gill, Proceedings of Academy of Natural Sciences of Philada., 1860, p. 111.

Body elongated aud subfusiform. Head conical in profile, mostly covered with cycloid scales. Tongue furnished with teeth arranged in a marginal band and iu an oval patch at its base. Preoperculum postcriorly serrated, below armed with spines directed forwards. Operculum with two spines. Suborbital bone entire. Dorsal fins disconnected; the first supported by nine spines. Aual fin with three spines and about ten branched rays.

There is only a single species of the genus Lalrax, as that genus has recently been restricted; it is found in the Mediterranean Sea and along the western coasts of Europe.

Type. Labrax diacanthus Gill.
Syn. Labrax lupus Cuv. et V'al., auct.

## Genus Dicentrarchus Gill.

Perca sp. Geoffrey.
Labrax sp. Cue, et Val.
Dicentrarchus Gill, Proceedings of Academy of Natural Sciences of Philada., 1860, p. 111.
This genus has been separated from the preceding on account of the presence of only two spines in the anal fin, and the smaller and less recurved teeth of the inferior margiu of the preoperculum.

Only one species is known; it has only been taken in the Mediterrauean Sea.

Type. Dicentrarchus elongatus Gill.
Syn. Labrax elongata Cuv. et Val.
Genus Roccus Gill.
Roccus Mitchill.
Lepibema sp. Rafinesque.
Roecus Gill, Procecdings of Academy of Natural Sciences of Philada., p. 111.

Head conical in profle; cheeks covered with cycloid scales. Tongue provided with a band of villiform teeth on each side and in a single or divided pateh at its base. Preoperculum posteriorly pectinated, below serrated. Operculum armed with two spines. Suborbital bones entire. Dorsal fius not united by the membrane; the anterior with nine spines. Anal fin furnished with three spines and from cleven to fourteen branched rays.

## Subgenus Roccus Gill.

Body elongated and subfusiform. Teeth on the base of the tongue arranged in longitudinal patches.

The only known species is the common "rock fish" or "striped bass" of the Americans; it dwells in the sea, and ascends the fresh water streams to spawn.

Type. Roccus lineatus Gill.
Syn. Labrax lineatus Cuv. et Val.

## Subgenus Lepibema Gill.

Body oblong-ovate and compressed. Teeth crowded at the base in a single oval patch.

Only one species of this subgenus is known ; it is fonnd in the rivers and lakes of the northern and central parts of the North American continent.

Type. Roccus chrysops Gill.
Syn. Labrax multilineatus Cuv. et Val.
Genus Morone Gill.
Morone sp. Mitchill.
Morone Cill, Proceedings of Academy of Natural Sciences of Philada., 1860, p. 111.

Body oblong-ovate, compressed, slightly gibbous at the commencement of the dorsal fin. Head conical in profile, entirely covered with ctenoid scales. Tongue provided only with a marginal band of villiform teeth. Preoperenlum pectinated behind and below. Operculum armed with two spines. Suborbital bones entire. Dorsal fins joined at their base by the slightly elevated membrane; first provided with nine spines. Anal fin with three spines and from seven to eleven branched rays.

Two species are known, both of which are peculiar to North America and the neighboring islands.

Type. Morone Americana Gill.
Syn. Labrax Americanus Itolbrook.
Genus Lateolabrax Bleeker.
Labrax sp. Cuv. et Val.
Perca-Labrax sp. Temminck et Schlegel.
Latcolabrax Bleeler.
Percalabrax Giinther, Catalogne of the Acanthopterygian Fishes, \&c., vol, i. p. $70,1859$.

Body elongated and subfusiform. Head conical in profile, covered with ctenoid scales. Preoperculum serrated behind, armed below with teeth recurved forwards. Operculum with two spines. Suborbital bones entire. Dorsal fins entirely separated ; the anterior with eleven spines. Anal fin sustained by three spines and eight rays.

The tongue is smooth, but the interbranchial isthmns has small areas of rilliform teeth.

A single species is found in the seas on the southern and sonth-eastern coasts of Asia and the neighboring archipelagoes.

Type Lateolabrax Japonicus Blecker.
Syn. Labrax Japonicus Cuv. et Val.
b. * *

Jaws, vomer and palate furnished with grannlar teeth.
Genns Psammoperca Richardson.
Labrax sp. Cuv. et Val.
Psammoperca Richardson, Voyage of the Erebus and Terror, Fishes, p. 116.
Body oblong-orate, compressed. Head conical in profile. Preoperculum with the anterior margin concealed; the posterior serrated, the inferior edentulous, and armed at its angle with a strong horizontal spine. Suborbital bones entire. Dorsal fins connected at the base; the anterior with eight spines. Anal fin shorter than the sccond dorsal, with three spines and nine rays.

One species is known; it is an inhabitant of the Indian and Australian Seas.

Type. Psammoperca waigiensis Bleeker.
Syn. Labrax waigiensis Cuv. et Jal.

## Genns Hypopterds Gill.

Psammoperca sp. Giinther, Catalogue of the Acanthopterygian Fish, \&c., vol. i. p. 69 .

Body ovate and compressed. Head conical in profile. Preoperculum serrated bchind, entire below, and armed at its angle with a large horizontal spine. Operculum with its posterior angle subrotundate. Suborbital bones serrated. Anterior dorsal with eight spines, the third of which is elongated. Anal fin longer than the second dorsal, and furnished with three spines and about thirteen rays.

Type. Hypopterus macropterus Gith. Syn. Psammoperea macropterns Guinther.
b. * * *

Villiform tceth on the jaws, romer and palate; none on the tongne.

## Gemus Percichthys Girard.

Perea sp. Cuv. et Val., Jenyns.
Percichthys sp. Girard, Proceedings of Academy of Natnral Sciences of Phiada., vol. ri. p. 197, 1854.
Body and candal peduncle elongated. Head conical in profile, with the snout obtusely rounded or convex. Preoperculum serrated behind, armed below with teeth directed forwards. Operculum armed with a single spine. Preorbital bones scarcely serrated. Dorsal fins connected at the base by an elevated membrane; anterior with nine spines. Anal fin armed with three spines. Branchiostegal membrane on each side with seven rays.

This genus is composed of species peculiar to the fresh water streams of the temperate transandean and the southern parts of South America.

Type. Percichthys chilensis Girard.

## Genus Percosoma Gili.

## Percichthys sp. Girard, Giinther.

Body elongated, bnt with the caudal peduncle quite short. Head conic in profile, with the snout obtusely rounded. Lower jaw and snborbital bones cavernous. Preoperculum scrated behind, armed below with recurred teeth. Operculum armed with one spine. Dorsal fins joined at the base by the clevated membrane; anterior with nine or ten spines. Anal fin armed with three spines.

The branchiostegal membrane appears to have only six rays on cach side.
A single species is known to inhabit the fresh water streams of Chili.
Type. Percosoma melanops Gill.
Syn. Percichthys melanops Girard.

## Genus Deuteropteres Gill.

Perca sp. Cuv. et Val.
Percichthys sp. Giinther.
Body elongated. Head conical in profile. Preoperculnm finely dentated bchind and beneath. Operculum terminating in a spine, above which a lobe is present. Suborbital bone serrated. The anterior dorsal fin furnished with nine spines; the second long, with a spine and abont seventeen rays. Aual fin with three spines and about ten branched rays.

Ouly one species of the genus is known ; its habitat is unknown.
Type. Deuteropterns marginatus Gill.
Syn. Perca marginata Cuv. et Val.
b. * * *

Head cntirely covered with scales. Preoperculum mostly entire. Anterior dorsal with abont six rays.

## Genus Liopropoma Gill.

Perca sp. Poey, Memorias sobra la Historia Natural de la isla de Cuba, rol. ii.
Body slender and subfusiform. Head elongated, conic in profile and anteriorly acute. Preoperculum entire. Operculum armed with a strong spine. Scales covering the whole head and the bases of the vertical fins. Dorsal fins counected at their bases; the anterior with six spines, the middle of which are longest; the second armed with three spines regularly increasing in length. Anal fin with three spines; the fin increasing in height posteriorly. Caudal fin emarginate. Lateral line anteriorly strongly curved.

A single species is found in the island of Cuba.
Type. Liopropoma aberrans Gill.
Syn. Perca aberrans Poey, Memorias sobra la Historia Natural de la isla de Cuba, vol. ii. p. 125, pl. 12, figs. 2, 3.
B.

Pseudobranchia absent or rudimentary. Tongue smooth. Teeth villiform.

Genus Lates Cuv.
Perca sp. Gmelin.
Centropomus sp Lacepede.
Lates Cuv., Règne Animal, ed. i. rol. ii.
Body oblong-orate and compressed. Head conical in profile. Preoperculum serrated behind, dentated below and armed at its angle with a large horizontal spine. Operculum with one spine. Suborbital bone serrated. Dorsal fins scarcely joined at the base ; the anterior furnished with seven or eight spines. Anal fin with three spines and about eight or nine branched rays.

The species of Lates have been only found as yet in Egypt and the rivers of the East Indies and China.

Type. Lates niloticus Cuv.
Genus Cxidon Müller and Troschel.
Cnidon Mïller and Troschel, Horæ Ichthyologicæ, vol. i. p. 21.
Body elongated. Head conical in profile. Preoperculum serrated behind, entire below and armed at the angle with a strong horizontal spine. Operculum spinous. Suborbital bone nearly entire. Dorsal fins two; the anterior with seven spines, the second provided with a spine and about thirteen branched rays. Aual fin with three spines and about nine branched rays.

The only species has been discovered in the Philippine islands.
Type. Cnidon chinensis Miller and Troschel.

## Synopsis generum Rhyptici et afflnium.

## THEODORE GILL, AUCTORE.

## Rhypticus Cuv.

Rhypticus Cuv. Règne Animal, vol. ii.
Anthias sp. Bloch. Systema Ichthyologire, Schneid. ed.
Corpus oblongum, compressum, antice altius. Preoperculum rotundatum, postice spinis crassis duabus armatum ; operculum triaculeatum. Pinna dorsalis longa, spinis duabus vel tribus portioni posteriori membrana conjunctis, Pinna analis spinis carens, vel spina minuta predita. Pinna caudalis rotundata.

## I. Reypticus saponaceus Cuv.

Jabonsillo Parra, Descripcion de deferentes Prezas de Historia Natural, p. 51, pl. 24, fig. 2, $178 \%$.
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